

**CLAIMS:**

What is claimed is:

- 1        1.    A method in a data processing system for managing  
2        traffic in a network data processing system, the method  
3        comprising:  
4                monitoring traffic for a plurality of network paths;  
5        and  
6                responsive to a packet for a particular network path  
7        within the plurality of network paths causing traffic for  
8        the particular network path to exceed a level of traffic  
9        allowed, reducing an amount of bandwidth available based on  
10       a fair share for the particular network path.  
  
1        2.    The method of claim 1, wherein the traffic is measured  
2        using at least one of a data transfer rate, peak data  
3        transfer rate, burst size, and maximum packet size.  
  
1        3.    The method of claim 1, wherein the reducing step  
2        comprises:  
3                reducing a congestion window size.

1        4.    The method of claim 3, wherein the congestion window  
2        size is reduced as follows:

3            
$$CW = \max(\text{MinW}, \min(CW * F, \text{MaxW}))$$

4        wherein CW is the congestion window size, MinW is a minimum  
5        congestion window size for the particular network path,  
6        MaxW is a maximum congestion window size for the particular  
7        network path, F is a fraction to cut the congestion window  
8        size for the particular network path.

1        5.    The method of claim 1, wherein the reducing step  
2        comprises:

3            setting a type of service for packets sent using the  
4        particular network path.

1        6.    The method of claim 1, wherein the reducing step  
2        comprises:

3            dropping the packet.

1        7.    A method in a data processing system for managing  
2        traffic in a network data processing system, the method  
3        comprising:

4            monitoring aggregate traffic for each of a plurality  
5        of network paths; and

1 responsive to aggregate traffic for a selected network  
2 path exceeding a threshold, reducing the aggregate traffic  
3 for the selected network path.

1 8. The method of claim 7, wherein the aggregate traffic  
2 includes at least one of a data transfer rate, peak data  
3 transfer rate, burst size, and maximum packet size.

1 9. The method of claim 7, wherein the reducing step  
2 comprises:  
3 reducing a congestion window size.

1 10. The method of claim 7, wherein the reducing step  
2 comprises:  
3 reducing a sending size for data packets.

1 11. The method of claim 7, wherein the reducing step  
2 comprises:  
3 changing a type of server for data packets for the  
4 selected network path.

1 12. The method of claim 7, wherein the threshold takes  
2 into account a fair share of bandwidth available for the  
3 plurality of network paths.

1 13. A data processing system comprising:  
2 a bus system;  
3 a communications unit connected to the bus, wherein  
4 data is sent and received using the communications unit;  
5 a memory connected to the bus system, wherein a set of  
6 instructions are located in the memory; and  
7 a processor unit connected to the bus system, wherein  
8 the processor unit executes the set of instructions to  
9 monitor traffic for a plurality of network paths; and  
10 reduce an amount of bandwidth available based on a fair  
11 share for the particular network path in response to a  
12 packet for a particular network path within the plurality  
13 of network paths causing traffic for the particular network  
14 path to exceed a level of traffic allowed.

1 14. The data processing system of claim 13, wherein the  
2 bus system includes a primary bus and a secondary bus.

1 15. The data processing system of claim 13, wherein the  
2 processor unit includes a single processor.

1 16. The data processing system of claim 13, wherein the  
2 processor unit includes a plurality of processors.

1 17. The data processing system claim 13, wherein the  
2 communications unit is an Ethernet adapter.

1 18. A data processing system comprising:  
2 a bus system;  
3 a communications unit connected to the bus, wherein  
4 data is sent and received using the communications unit;  
5 a memory connected to the bus system, wherein a set of  
6 instructions are located in the memory; and  
7 a processor unit connected to the bus system, wherein  
8 the processor unit executes the set of instructions to  
9 monitor aggregate traffic for each of a plurality of  
10 network paths; and reduce the aggregate traffic for the  
11 selected network path in response to aggregate traffic for  
12 a selected network path exceeding a threshold.

1 19. The data processing system of claim 18, wherein the  
2 bus system includes a primary bus and a secondary bus.

1 20. The data processing system of claim 18, wherein the  
2 processor unit includes a single processor.

1 21. The data processing system of claim 18, wherein the  
2 processor unit includes a plurality of processors.

1 22. The data processing system claim 18, wherein the  
2 communications unit is an Ethernet adapter.

1 23. A data processing system for managing traffic in a  
2 network data processing system, the data processing system  
3 comprising:

4 monitoring means for monitoring traffic for a  
5 plurality of network paths; and

6 reducing means, responsive to a packet for a  
7 particular network path within the plurality of network  
8 paths causing traffic for the particular network path to  
9 exceed a level of traffic allowed, for reducing an amount  
10 of bandwidth available based on a fair share for the  
11 particular network path.

1 24. The data processing system of claim 23, wherein the  
2 traffic is measured using at least one of a data transfer  
3 rate, peak data transfer rate, burst size, and maximum  
4 packet size.

1 25. The data processing system of claim 23, wherein the  
2 reducing means comprises:

3 means for reducing a congestion window size.

1 26. The data processing system of claim 25, wherein the  
2 congestion window size is reduced as follows:

3 
$$CW = \max(\text{MinW}, \min(CW * F, \text{MaxW}))$$

4 wherein CW is the congestion window size, MinW is a minimum  
5 congestion window size for the particular network path,  
6 MaxW is a maximum congestion window size for the particular  
7 network path, F is a fraction to cut the congestion window  
8 size for the particular network path.

1 27. The data processing system of claim 23, wherein the  
2 reducing means comprises:

3 setting means for setting a type of service for  
4 packets sent using the particular network path.

1 28. The data processing system of claim 23, wherein the  
2 reducing means comprises:

3 dropping means for dropping the packet.

1 29. A data processing system for managing traffic in a  
2 network data processing system, the data processing system  
3 comprising:

4 monitoring means for monitoring aggregate traffic for  
5 each of a plurality of network paths; and

6 reducing means, responsive to aggregate traffic for a  
7 selected network path exceeding a threshold, for reducing  
8 the aggregate traffic for the selected network path.

1 30. The data processing system of claim 29, wherein the  
2 aggregate traffic includes at least one of a data transfer  
3 rate, peak data transfer rate, burst size, and maximum  
4 packet size.

1 31. The data processing system of claim 29, wherein the  
2 reducing means comprises:

3 means for reducing a congestion window size.

1 32. The data processing system of claim 29, wherein the  
2 reducing means comprises:

3 means for reducing a sending size for data packets.



1 33. The data processing system of claim 29, wherein the  
2 reducing means comprises changing a type of server for data  
3 packets for the selected network path.

1 34. The data processing system of claim 29, wherein the  
2 threshold takes into account a fair share of bandwidth  
3 available for the plurality of network paths.

1 35. A computer program product in a computer readable  
2 medium for managing traffic in a network data processing  
3 system, the computer program product comprising:

4 first instructions for monitoring traffic for a  
5 plurality of network paths;

6 second instructions, responsive a packet for a  
7 particular network path within the plurality of network  
8 paths causing traffic for the particular network path to  
9 exceed a level of traffic allowed, for reducing an amount  
10 of bandwidth available based on a fair share for the  
11 particular network path.

1 36. The computer program product of claim 35, wherein the  
2 traffic is measured using at least one of a data transfer  
3 rate, peak data transfer rate, burst size, and maximum  
4 packet size.

1 37. The computer program product of claim 35, wherein the  
2 reducing step comprises:

3 third instructions for reducing a congestion window  
4 size.

1 38. The computer program product of claim 37, wherein the  
2 congestion window size is reduced as follows:

3 
$$CW = \max(\text{MinW}, \min(CW * F, \text{MaxW}))$$

4 wherein CW is the congestion window size, MinW is a minimum  
5 congestion window size for the particular network path,  
6 MaxW is a maximum congestion window size for the particular  
7 network path, F is a fraction to cut the congestion window  
8 size for the particular network path.

1 39. The computer program product of claim 35, wherein the  
2 second instructions comprises:

3 instructions for setting a type of service for packets  
4 sent using the particular network path.

1 40. The computer program product of claim 35, wherein the  
2 second instructions comprises:

3 instructions for dropping the packet.

1 41. A computer program product in a computer readable  
2 medium for managing traffic in a network data processing  
3 system, the computer program product comprising:

4 first instructions for monitoring aggregate traffic  
5 for each of a plurality of network paths; and

6 second instructions, responsive to aggregate traffic  
7 for a selected network path exceeding a threshold, for  
8 reducing the aggregate traffic for the selected network  
9 path.

1 42. The computer program product of claim 41, wherein the  
2 aggregate traffic includes at least one of a data transfer  
3 rate, peak data transfer rate, burst size, and maximum  
4 packet size.

1 43. The computer program product of claim 41, wherein the  
2 second instructions comprises:

3 instructions for reducing a congestion window size.

1 44. The computer program product of claim 41, wherein the  
2 second instructions comprises:

3 instructions for reducing a sending size for data  
4 packets.

1 45. The computer program product of claim 41, wherein the  
2 second instructions comprises:

3 instructions for changing a type of server for data  
4 packets for the selected network path.

1 46. The computer program product of claim 41, wherein the  
2 threshold takes into account a fair share of bandwidth  
3 available for the plurality of network paths.